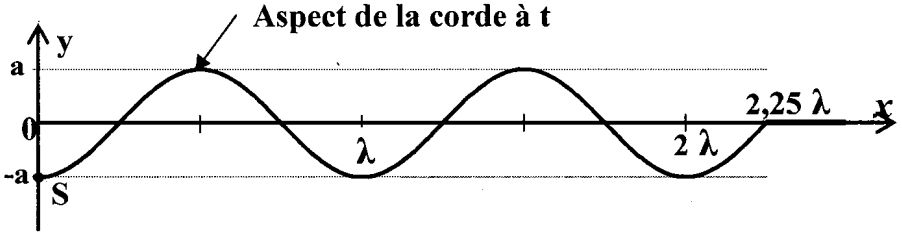
4°)

a- $t = 4{,}5\,10^{-2}s = 2{,}25T$

$$T = \frac{1}{N} = \frac{1}{50} = 2\,10^{-2}s$$

La distance parcourue par l'onde

$d = x_{finale} = vt = 2{,}25\lambda$



b- $y = -10^{-2}m = -a$

D'après l'aspect de la corde il y a 3 points

$x = 0$

$x = \lambda$ et $x = 2\lambda$

5°)

a- À t_1 , $x_{f_1} = ct_1 = 40cm = 2\lambda$

à t_2 , $x_{f_2} = ct_2 = 55cm = 2{,}75\lambda$

$x_{f_2} - x_{f_1} = C(t_a - t_1)$

$$C = \frac{x_{f_2} - x_f}{t_2 - t_1} = \frac{1510^{-2}}{0{,}7510^{-2}} = 20ms^{-1}$$

* $\lambda = 20 = 0{,}2m$

* $N = \frac{C}{\lambda} = \frac{20}{0{,}2} = 100Hz$

b- $x_{f_1} = ct_1 \Rightarrow \frac{x_f}{C} = \frac{0{,}4}{20} = 2\,10^{-2}s = 2T$

$x_{f_2} = ct_2 \Rightarrow t_2 = \frac{x_f}{C} = \frac{0{,}55}{20} = 2{,}75.10^{-2}s$

c- $y_s(t) = a\sin(200\pi t + \varphi_s)$

$\omega = 2\pi N = 200\pi\ rads^{-1}$

À $t = t_2 = 2{,}7510^{-2}s$ $y_s(t_2) = a$

$y_s(t_2) = a\sin(200\pi.2{,}7510^{-2} + \varphi_s) = a$

$\sin(5{,}5\pi + \varphi_s) = 1$

$5{,}5\pi + \varphi_s = \frac{\pi}{2}$

$\varphi_s = -5\pi = \pi - 6\pi$

$y_s(t) = 10^{-2}\sin(200\pi t + \pi)$

Ou bien le front d'onde est un creux $\Rightarrow \varphi_S = \pi$